Nanostructured Super-Black Optical Materials

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Abstract
Need: NASA faces challenges in imaging and characterizing faint astrophysical objects within the glare of brighter stellar sources. Achieving a very low background requires control of both scattered and diffracted light.Significance of the Innovation: Aligned arrays of carbon nanotubes have recently been recognized as having world-leading optical absorption, far above competing state of the art materials. The nanotube array's diffuse reflectance (10-7) was demonstrated at two orders of magnitude lower than commercially available low reflectance carbons (10-5). The integrated total reflectance 0.045%, bested the field of competing materials, which are typically>1% at optical wavelengths. However, these arrays were produced on silicon, so they have limited utility for aerospace applications. NanoLab identified the potential to grow these arrays on flexible substrates, and proposed a Phase I effort to explore their properties.

* information listed above is at the time of submission.